AGRICULTURAL ENGINEERING

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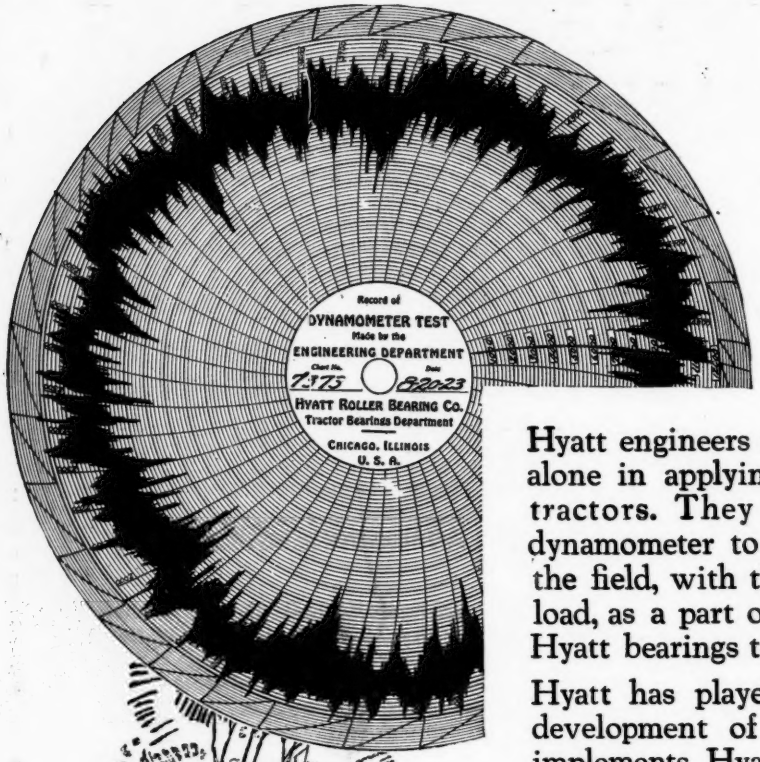
The Object and Scope of A. S. A. E. Activities

THE American Society of Agricultural Engineers was organized in December, 1907, at the University of Wisconsin by a group of instructors in agricultural engineering from several state agricultural colleges, who felt the need of an organization for the exchange of ideas and otherwise to promote the advancement of agricultural engineering. The object of the Society, as defined by the Constitution, is "to promote the art and science of engineering as applied to agriculture, the principal means of which shall be the holding of meetings for the presentation and discussion of professional papers and social intercourse, and the general dissemination of information by the publication and distribution of its papers, discussions, etc."

The membership of the Society represents all phases of agricultural engineering, including the educational, professional, industrial, and commercial fields.

The scope of the Society's activities embraces both the technical and economic phases of the application of engineering to agriculture, and is comprehended in the following general headings:

(a) Farm Power and Operating Equipment—power, implements, machines, and related equipment.
(b) Farm Structures—buildings and other structures and related equipment.
(c) Farm Sanitation—water supply; sewage disposal; lighting, heating, and ventilating of farm buildings, and related equipment.
(d) Land Reclamation—drainage, irrigation, land clearing, etc., and related structures and equipment.
(e) Educational—teaching, extension, and research methods, etc., employed in the agricultural engineering field.



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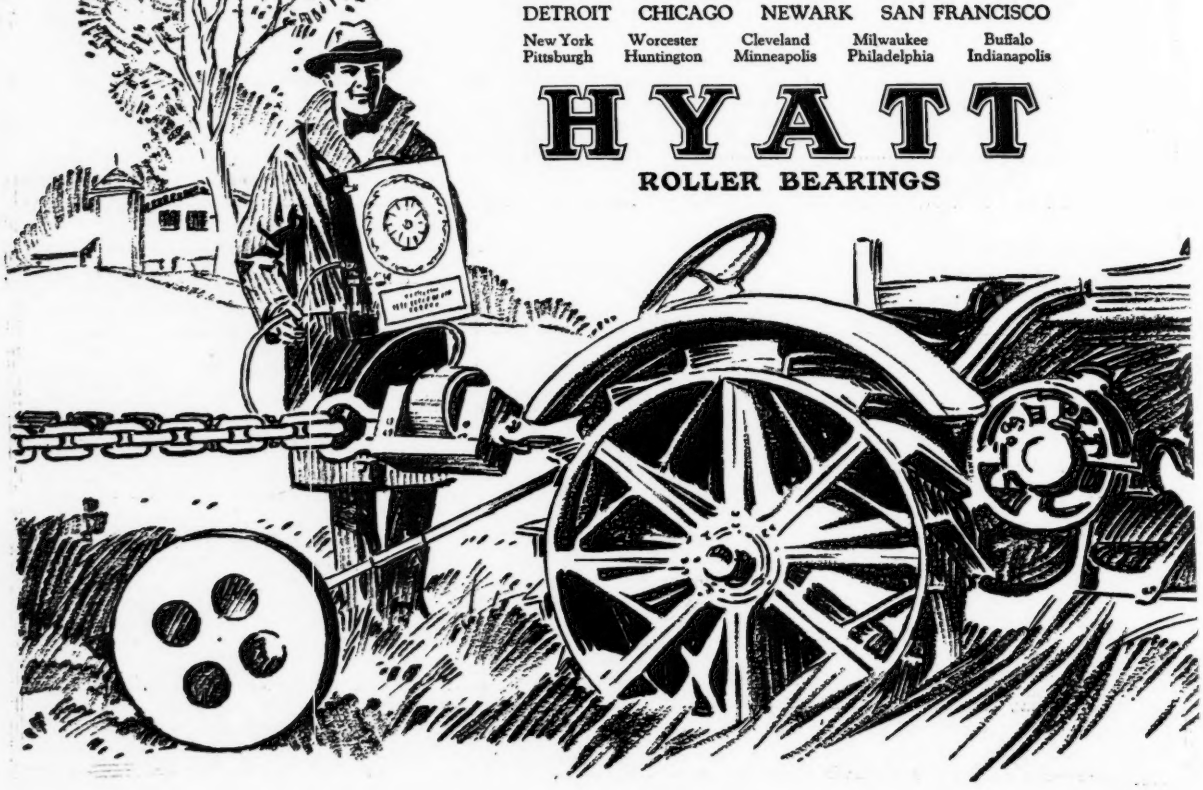

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Agricultural Engineering and the American Society of Agricultural Engineers

By R. W. Trullinger

Mem. A. S. A. E. Specialist in Rural Engineering, Office of Experiment Stations, U. S. Department of Agriculture

FROM the standpoint of logic, development is an expansion by means of which the elements contained in a given concept are made explicit. It is a gradual unfolding process, disclosing that which is unknown and resulting in a gradual advance or growth through a series of intelligently conducted progressive changes. If a profession such as agricultural engineering is in process of development it is neither standing still nor going backward. On the contrary, it is growing and expanding, more is being learned about its unknown features, and its indefinite features are being made more explicit. That is why then that the development of his profession means increased knowledge and efficiency and greater earning power to the sincere, intelligent, and observant agricultural engineer.

Why is such a development of the field of agricultural engineering so important to agricultural engineers? Because teachers in agricultural engineering must be kept up to date and properly informed in order that they may give the student in agricultural engineering the required instruction. Extension specialists in agricultural engineering must not only be equipped to solve the usual run of field problems, but must be kept abreast of the times so as to meet intelligently all sorts of new problems and occasional pressing emergencies. Consulting agricultural engineers must be able to solve both routine and special problems by established engineering principles. In addition they must be equipped and ready to resort to a fundamental agricultural-engineering science in order to meet important emergencies. Research agricultural engineers must be equipped to use general fundamental science as well as established agricultural and other engineering technique to solve the problems placed before them by extension and consulting engineers, teachers, manufacturers, and others. Manufacturers of farm equipment especially must be kept informed as to the status of farm-engineering requirements, since the great majority of them have little or no time for the conduct of research to establish the new engineering principles required to meet each new problem.

The importance of a central clearing house or point of contact to which all these agricultural engineers can turn for information and guidance thus becomes obvious. That is why an organization such as the American Society Agricultural Engineers is essential to the general development of the field of agricultural engineering, and to the advancement of individuals in that field.

Such an organization obviously has numerous functions, some of which are of interest only to individual engineers, while others are of interest and are more or less beneficial to all agricultural engineers. But the most prominent and important collective function of the American Society Agricultural Engineers is undoubtedly its activity in promoting development in the field of agricultural engineering for the benefit of all its members. As a result of this activity, the whole category of agricultural engineers, including teachers, extension specialists, research engineers,, consulting engineers, and designers and manufacturers of farm equipment, constantly look to the Society for a certain amount of information and guidance to keep them up to date and abreast of the development of the profession.

Now, how does the American Society of Agricultural Engineers go about it to promote and actually bring about development in the field of agricultural engineering? It is a more or less complex organization of engineers of different types whose training and experience may very quite widely. However, the matter simplifies itself somewhat when it is realized that the majority of these engineers are connected with state and federal agricultural educational and research institutions or with private manufacturers of farm equipment. Some few are private consulting engineers and the number of these is increasing.

It is realized that neither the field of agricultural engineering nor any other field can undergo a process of development without a firm foundation upon which to base procedure. The matter is therefore much further simplified when the ultimate aim or objective of these engineers is considered. That objective in its last analysis is the formulation of a distinctly agricultural-engineering science to serve as a basis or foundation for the profession of agricultural engineering.

So, in order to bring about this process of development, the American Society Agricultural Engineers has equipped itself with several technical and educational committees functioning under the general supervision of officials elected from the membership and each dealing with certain specific types and classes of problems.. A general research committee is also provided, the duties of which are largely of an advisory nature. These committees, operating either individually or in cooperation, summarize the available information on selected, pressing problems, determine what should be known that is unknown, and, by the process of development defined above, eventually bring the important unknown to light for practical use by agricultural engineers at large.

As stated above, the Society has a more or less direct contact with state, federal, and private research agencies through its membership. As a central agency it is thus in a more or less favorable position to recommend important problems for the consideration of such research agencies and, in some cases, to advise as to methods of procedure. The contact of the Society with educational institutions is even more direct and its influence upon educational policies is marked. Thus the Society through its committees and its various points of contact undertakes to guide its members as a whole, whether they be students, teachers, consulting or research engineers, or manufacturers.

Now, how are these committees made up and, in general, how do they function? They are made up of members of the Society who have been specially selected and who have volunteered their services in order that the development of the field of agricultural engineering may

proceed. These members are men who are not only specially fitted for certain committee work but who are willing to devote their spare time unselfishly to the devising of ways and means to develop agricultural engineering. Obviously then all committees to succeed must be assisted by the entire Society membership.

The development activities of the Society are directed as a whole by officials elected from the membership. Under this general supervision individual activities are planned by individual committees and are conducted with the cooperation and assistance of the entire Society membership. Thus the Society functions as a large cooperative body in matters of development and in this respect is "all for one and one for all."

Naturally it has taken years of careful consideration and planning by leading agricultural engineers to construct the present development machinery of the Society. While that machinery is admittedly far from perfect, it may be said that through its systematic and methodical operation it has been constantly reconstructed and improved, and at the same time has yielded a quite sizeable nucleus of a foundation for an important field of engineering.

Now, how can a member of the American Society Agricultural Engineers be helped by his membership to advance and to render a larger and better service as an engineer? That question may perhaps best be answered by the old rule that in a technical society as well as in a technical school a man gains knowledge and profits thereby in proportion to the time and attention he devotes to the activities of the society or school pertaining to his specialty. The American Society Agricultural Engineers is no exception to this rule.

Some engineers may feel that because they have paid the admission fee and annual dues they should receive automatically some benefit without other effort on their part. They undoubtedly do benefit to the extent of receiving the monthly technical journal of the Society and the proceedings of the annual meetings, and by being identified with the other members. But they cannot possibly be benefitted to the extent that they would be if they made an effort to participate in some way in all of the Society activities.

Attendance at meetings, participation in technical or educational discussions, service on technical committees, and contributions of technical knowledge and ideas either verbally or in writing for general use by the Society membership are some of the ways in which a member can assist in the development of the field of agricultural engineering and thereby profit himself.

For instance, the extension specialist can indirectly increase his knowledge and widen the scope of his activities and usefulness by bringing information regarding important and pressing unsolved problems to the attention of the proper research agencies. It is only through the existence of a definite requirement for additional facts that research agencies are justified in taking up new research. Again, all agricultural engineers have more or less information peculiar to their individual experiences which, if incorporated in short, snappy papers, preferably illustrated, and submitted for publication in "Agricultural Engineering", the journal of the American Society Agricultural Engineers, would make interesting and instructive reading for the other members. The exchange of ideas resulting from such a procedure is of inestimable value, and each member making a contribution has the additional benefit of experience in presenting ideas in writing.

Thus it is evident that sincere effort, intelligent application, and unselfish cooperation on the part of all members of the American Society Agricultural Engineers are necessary to bring about the desired development of the field of agricultural engineering, accompanied by returns to the individual member in the way of increased knowledge, efficiency, and earning power. It is suggested in this connection that each member of the Society, from junior to honorary, take stock of his membership in this technical society and determine what he can do to render a larger and better service to his profession and thereby better himself.

Land Utilization in the United States*

By David Weeks

Mem. S. E. A. E. Research Specialist, Department of Agriculture, University of California, and the Federal Land Bank of District No. 11 Cooperating

THERE is an ungent need of extending many of the features of planned rural development, now being demonstrated in the state settlements at Durham and Delhi, California, to communities already settled. This is a somewhat new phase of the land utilization problem which has developed during an investigation the writer is making for the University of California and the Federal Land Bank of Berkley on the economic condition existing in irrigation enterprises. It has become evident that a man trained for the work should be placed in each irrigation enterprise with a staff in proportion to the size of the district and the type of agriculture. The duties of this expert would be to render advice and service to the settler in the matter of planning his farm buildings, letting contracts for same, designing farmstead layouts, preparing land for irrigation, laying out the farm system, organizing community drainage and many other services of an engineering nature. Economic use of power and equipment on the farm should be made a special study and in many cases cooperative arrangements for a more advantageous use of power equipment could be arranged.

In addition, ,the settler must receive advice and service on many business and financial matters. Just as is advocated for new communities, social and business centers should be provided in these older settlements where the farmers can get together for recreation or to discuss the many problems common to any settlement.

Such an organization requires financial support. Furthermore, to be effective there must be some way of enforcing the carrying out of certain things which affect the welfare of the entire community. This plan must not be carried out with the idea of replacing the farm bureau movement. It should supplement the office of farm advisor, in that many of the projects now being in the form of general advice could be applied intensively to many local areas.

Under the plan of settlement of new communities the cost of such service is added to the land. It is suggested that, inasmuch as a great majority of the farmers in such areas are heavy borrowers, the credit agencies extending these loans assemble their efforts in the organizing of such bureaus in various districts for the protection of their loans, thereby increasing the security value of land in the district. Such an organization could do a great deal of good, not only in giving advice but by demanding that certain things be carried out by the farmer in consideration of the privilege of borrowing money to finance his farming business.

It is believed that the loss incurred each year in the absence of such an agency more than justifies serious consideration of some such plan. This tenative suggestion is advanced after a partial analysis of certain data which will be added to greatly during the coming year. It is hoped that at the end of this year's work a conference of those interested can be held to crystallize some of these immature ideas.

An expert trained for this work is entitled to be recognized as an agricultural engineer. Unfortunately, in the West where the need exists and where the demand will come if proper institutions are created to provide the funds, no such professional training is possible unless the student follows a decidly irregular course. The agricultural engineering graduate from the East must undergo additional training is he is to acquaint himself with the agricultural-engineering problems which are waiting for the trained man of vision and constructive ability.

*From the 1923 progress report of the Committee on Land Utilization.

Ventilation for Potato Storage*

By C. S. Whitnah

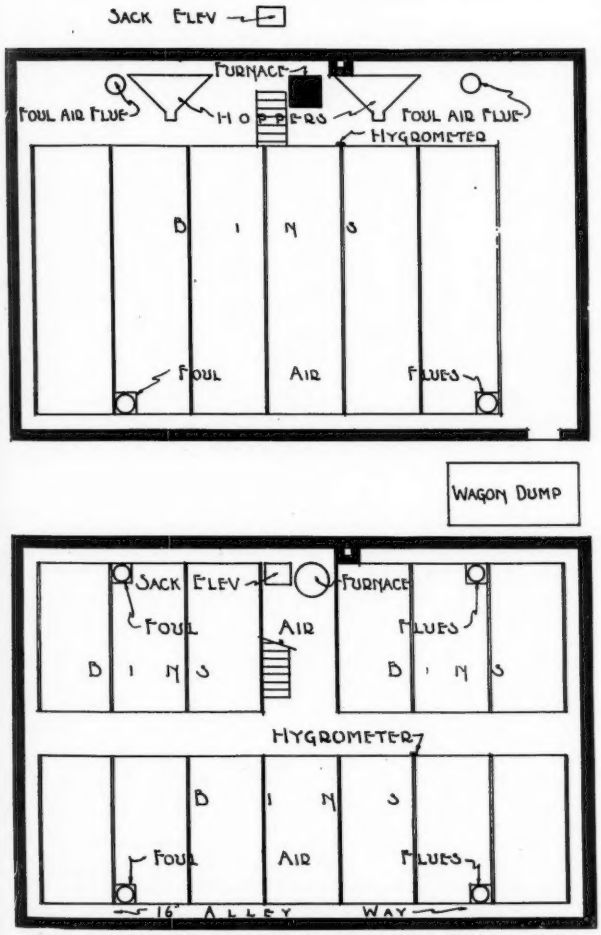
Jun. A. S. A. E. Associate in Research and Extension, King Ventilating Company

THE POTATO is receiving greater attention today than ever before in its history. In countries where it is most needed, there has been its greatest development. At the hands of man single tubers of new varieties in England have sold for fabulous prices. New and improved sorts are jealously guarded by their originators. Growers, government and state experimentors, and other scientific men, in all countries, are now working for varieties that will produce the greatest possible tonnage of the highest class product. They are also looking for cultural methods best suited to accomplish this.

A good potato is firm and crisp, with tissues sound and plump. Its cells are well filled with starch. This kind cooks evenly and is both nutritious and delicious. By actual demonstration it has been shown that smooth, clean-skinned potatoes, with shallow eyes and smooth eyebrows, weighing about twelve ounces, would double the price over the average potatoes now on the market.

Five factors enter into the erection of a modern potato warehouse: (1) Building plans; (2) inside arrangement of storage bins for air circulation and handling convenience; (3) insulation; (4) ventilation, and (5) adequate potato handling equipment. Each factor requires individual consideration.

Potato warehousing is doubly important today because the Northwest is organizing for the cooperative marketing of the 1924 potato crop. The key to the success of the orderly merchandising of potatoes by the farmer is pooling. And pooling cannot be done without proper storage of the crop.



First floor plan (top) and the basement plan (bottom) of the Mendsen Brothers model ventilated potato warehouse

The requisite for the successful storage of potatoes, or other root crops, is that they be fully mature. They should also be dry and free from mud. Sunburn, freezing, and scars from rough handling—any one of them will prevent the storage from being successful.

The mature ripeness of the root crops is not reached until some time after they have been placed in storage. The length of the storage depends upon various conditions. One is the care with which they have been stored. Another is the character of the storage. Still another is a constant temperature and the humidity of the air in the storage room. These are the main things to watch and to stabilize as closely as possible.

In so-called winter storage, a certain stage of development, when reached, must be maintained. The stored potatoes or other roots will then remain in a good condition for at least eight or nine months, or until the earliest of the next season's crop is available.

One of the worst enemies of storage is the growth of decay. Dry rot, scab and many other infections start in to destroy the stock, if conditions are favorable to their growth. Maintaining an even temperature and controlling the moisture in the air are the best means of fighting decay.

The evil of sprouting is done away with only by maintaining the proper temperature. Authorities agree that this should be between 33 and 38 degrees. The lower the temperature, the fewer will be the sprouts.

Freezing can only be prevented by carefully insulating the house, controlling the ventilating system, and in extreme weather, the careful use of artificial heat.

It is commonly known that one of the things to be overcome in storage is the shrinkage. Because of this the rise in the market often does not make the storage profitable. Shrinkage is reduced by maintaining proper conditions such as I will describe later.

It is well known that the inside surface of any wall of a heated building is colder than the air in the room. The stock that touches the outside walls is ttherefore almost sure to freeze because the proper temperature for storing potatoes is only about two or three degrees above freezing. (I would recommend a wall having a heat loss of not more than twenty per cent.)

When there is no ceiling above the stock, the roof should be as well insulated as the walls against the loss of heat.

A means of heating the building should be provided whenever necessary to prevent freezing. When the outside temperature makes a drop from twenty to forty degrees, we all know that artificial heat will be needed, that is, if the temperature in the house before the drop was sufficiently low. Stoves have been successfully used when located in several parts of the warehouse. One stove is sufficient in the small root cellar. These should have jackets so that the direct radiation does not heat part of the stock too warm and leave other parts of the room cold.

Thermometers should be hung in several parts of the room. These must be watched carefully, to make the success of the storage sure. It is a good idea to mark the thermometers at about thirty-five degrees. This emphasizes the fact that the temperature is to be maintained as evenly as possible.

To maintain the control of the temperature and moisture of the air in any space used for storage, ventilation should be provided that will draw the foul air out of the storage room. It should admit the fresh air rapidly

enough to maintain its approximate purity. It should carry out the excessive moisture which accumulates. It should also provide for the proper control of the air movement, to avoid freezing in cold weather, wherever artificial heating is provided to keep up the temperature of the air during the coldest weather, in climates where this is necessary.

During the first part of the season, the weather is apt to be so warm that the problem is to keep the temperature low enough. This is the time when the stock throws off the most heat. Then the ventilating system is called upon to circulate large quantities of air. Since the object of this circulation is to remove the heat, the air is then removed from near the ceiling, through the heat loss doors. These are placed in the ventilating flue for that purpose. Later in the season these conditions are reversed. The problem is to circulate the air and to retain as much of the heat as possible. Then the air is taken from the floor, which is the coolest part of the room.

The ventilating system is designed to draw the air through all parts of the room. To make this plan entirely successful, it is necessary to have the bins constructed of slatted partitions. False floors should be made so that the air will circulate under the piles of stock. Proper ventilation systems are provided with felted dampers. These, when closed, prevent the entrance of any cold air into the lower part of the flue. One damper is provided above the stock in the first story. By this the two floors may be regulated at once, if desirable. Right above the smaller flue is a damper. This is so constructed that the opening from the first floor is closed and the air is drawn from the basement only. Just above the stock in the basement is a third damper. This closes the flue from the basement so that the air can be drawn from the first floor only.

These dampers are equipped with the necessary chains and rods whenever the flue is located away from any passageway. The amount of moisture in the potato warehouse can thus be governed by controlled ventilation.

In a test made the relative humidity was lowered from 82 to 48 per cent in about twelve hours. It then remained at 48 per cent. The temperature of the air at the same place was 36 degrees throughout the entire test. The outside temperature was about zero. This record was obtained from a recording instrument which gave a continuous record of the humidity and temperature.

Moisture has a great influence on the growth of decay and on the sprouting of the potatoes in storage. A ventilating system which will control the heat and moisture is the best remedy.

Recently I visited the Mendsen Brothers potato warehouse. Mr. Lawrence Mendsen opened the door of his warehouse and led me through the passageways into the center of the house. "I keep the moisture of my house at 50 per cent," he told me. "I keep these hygrometers under my eye all the time. There is one in the basement and one on the first floor. I watched them closely. It is the control of the moisture that keeps my potatoes. You see this one upstairs registers 52 per cent; the one downstairs registers 48 per cent. Once understood, it is a very simple matter to keep the moisture under control. Every time I leave the house closed up with the ventilating dampers all closed, the humidity gradually rises. When it gets too high all I have to do is to build a little fire and open up the ventilating system. This enables me to reduce the moisture without making any great change in the temperature.

"I have six thermometers, three in the basement and three on the first floor. So I can tell when any part of the house gets too warm or too cold. The temperature has not been above 38 degrees or below 34 degrees at any time this winter. When you look at my potatoes, you will see that it has paid me well to take good care of my warehouse, and maintain the proper temperature and good ventilation.

"See the passageways around the bins in my warehouse. They are all clear, so the air can circulate through them. If they were not, there would be spaces which would get too cold. They would also be damp. Last fall I had potatoes piled in this passageway here. The space behind them was getting cold before the rest of the house.

"I have built hoppers so that the air can circulate between them and the walls. Although they are slatted, I found that the space behind the hoppers was apt to get cold. This will not do at all.

"Some people think that they can get rid of the moisture by just heating up the house without any ventilating system. I have found by watching these hygrometers that this does not do any good. To heat up the house without a ventilating system simply makes it too warm for the potatoes. They start to sprout. Besides, as soon as it cools off a little, the moisture is there just the same.

"This hygrometer shows just what the percentage of moisture is at any time. You can see how sensitive it is by blowing your breath against it. This raises the moisture content of the air and the humidity shown is higher.

"I have my pipeless furnace arranged so that I can circulate the air either upstairs or downstairs or both. This is the best way to heat a potato warehouse. The circulation of the air around through the passageways keeps an even temperature. It is much better than to have the heat radiated from a hot stove.

"The valve intakes on this ventilating system are automatic. When there is a strong wind from the north, for instance, those on the south side of the building close. This prevents making a draft through the building. It does not take long to freeze potatoes if you have a draft. Those automatic intakes also keep the air coming into the building continuously so that there can be a good draft through the foul air flues.

"I believe you will find this house is just about the best arrangement that can be figured out. We have stored 25,000 bushels of potatoes this year in this house. It is only 38 by 52 feet. This is because I do not take up a lot of room for sacking. I have a good system of toting our sacks out into the car, and for taking care of the potatoes when they are brought into the house.

"Last Fall we put 1400 bushels into this bin and this spring took out 1288 bushels. You will notice that it is an unusually small shrinkage, or only about 8 per cent. A number of warehouse owners tell me their shrinkage is from 15 to 20 per cent. Just figure out the saving."

Suppose that he saved the difference between 15 per cent and 8 per cent that was his actual shrinkage. This means a saving of about 7 per cent on the total number of bushels of potatoes in his warehouse.

This amounts to 1750 bushels which are worth about 40 cents per bushel, or a saving of about $700 on the shrinkage alone.

"We have been getting a premium of about 10 cents on the bushel," he said, "for potatoes we have shipped to market as seed potatoes. We would not be able to do this if I had not kept them in A-1 condition by properly regulating the ventilation. It is hard to say just how much money I have made this way.

"Put your hand on the ceiling boards here and notice how dry and straight they are. They are in just as good shape as they were when the house was put up last summer. I was in another warehouse the other day which was built last summer and had not been ventilated. The ceiling boards were actually hanging down from the ceiling. We would not be without ventilation for several times its cost."

Rural Electrification

AGRICULTURAL engineers will be faced more and more as time goes on with the various problems arising out of the application of electricity to farm requirements; probably no phase of agricultural-engineering development will receive greater impetus during the next few years than this one. It is a field "charged" with great "potential" possibilities—not only along the lines of agricultural advancement through furnishing power, light, and heat for farm needs, and raising the standard of farm living, but also in opening up a larger field of service for the agricultural engineer.

Flow Characteristics of Household Sewage from the Isolated Home*

By H. B. Walker

Mem. A. S. A. E. Professor of Agricultural Engineering, Kansas State Agricultural College

A STUDY of the various state bulletins on sewage disposal where some type of septic tank is utilized reveals a wide range of practice in fundamental matters relating to the design of tanks. Much of the information now in print has been passed from one station to another and very few original investigations have been made of actual farm conditions to determine the nature of the problem to be met. Because of the wide diversity of practice and the increasing demand for information by the rural population, the agricultural engineering section of the engineering experiment station at the Kansas State Agricultural College outlined a series of problems for investigation and experimentation along farm sewage disposal lines. The plan of work undertaken will involve from five to ten years. Intensive studies are not possible because of limited funds, and this accounts in a measure for the long time allotted to the project.

The investigation I wish to report, on the flow characteristic of household sewage from the isolated home, is too brief to have much practical value at this time, but it is hoped the data may stimulate an interest in the problem. A search of information on the rate, volume, and quantity of farm sewage has revealed but little information of practical value on which to base designs for farm sewage disposal plants. This might well be expected when one takes into account the great number of variable factors which contribute to the nature and capacity of farm sewage. These factors include the size of family, plumbing facilities, type of farming, seasonal requirements of water, standards of living of the family, etc. It may appear doubtful to many if any information of value can be secured which may be used for general application. On the other hand, no problem of a technical nature can be logically solved unless the various elements composing the problem are analyzed.

Realizing the need for actual facts which might be useful in securing further data, it was decided to make actual flow charts of sewage from a typical farmstead. The agronomy farm at the college was selected for this purpose. This is a 320-acre farm devoted largely to crops. The eight-room house is modern, and in its essential details it is not unlike many other farm homes in Kansas where modern improvements are needed and desired. The plumbing appliances consist of a toilet, bath tub and lavatory, shower bath in the basement, and a kitchen sink. The basement is equipped for laundry work. Cistern and well water is provided. The former is pumped by hand, and the well water is pumped by a gasoline engine. Pressure is furnished by a hydro-pneumatic tank. The number of persons living in the house is variable, depending upon the urgency of the farm work. During the progress of our work so far, from seven to eleven persons have been served. The sewage is carried away through a 6-inch sewer line to a septic tank equipped with a 4-inch Miller automatic siphon. The septic chamber was designed with a capacity of approximately 550 gallons and the dosing chamber with a capacity of approximately 210 gallons. It was thought that the design would provide for flushing at least once in 24 hours, and it was the opinion of the designer, based upon preliminary data provided by the occupants of the farm, that the average sewage flow would be in the neighborhood of from 30 to 35 gallons per person per day.

In order to provide a means of measurement of the sewage flow it was decided to use the rectangular dosing chamber as a measuring box, and it was constructed and calibrated for this purpose. It remained then to record automatically the fluctuation of the water level in the dosing chamber. Two factors contributed to the change of water level in the tank, viz.: (1) the flow of sewage from the septic chamber, which would cause a rising stage; and (2) the automatic operation of the siphon which, on the other hand, caused an abrupt removal of the collected sewage. The former depended upon the rate of the accumulation of the sewage from the house, and the latter depended upon the water level of the dosing chamber. The ascent of the water was relatively slow, requiring from 12 to 30 hours, while the descent was quick, requiring little more than a minute. A record of the fluctuation of the dosing chamber would provide a reasonably accurate record of the rate of sewage flow from which the total quantity of flow could be determined.

For this purpose a Stevens water stage recorder was installed, as shown in Fig. 1, The float is located in a stilling box in the dosing chamber, the rise and fall are recorded on the cylinder by a pencil, which receives its vertical motion by the stage of water in the tank. The horizontal motion is recorded on the cylinder actuated by an eight-day clock located within the cylinder. Fig. 2 shows

* Part of the 1923 report of the Committee on Farm Sanitation.

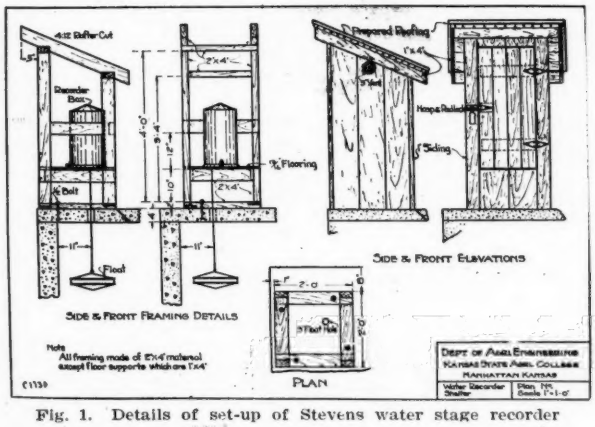


Fig. 1. Details of set-up of Stevens water stage recorder

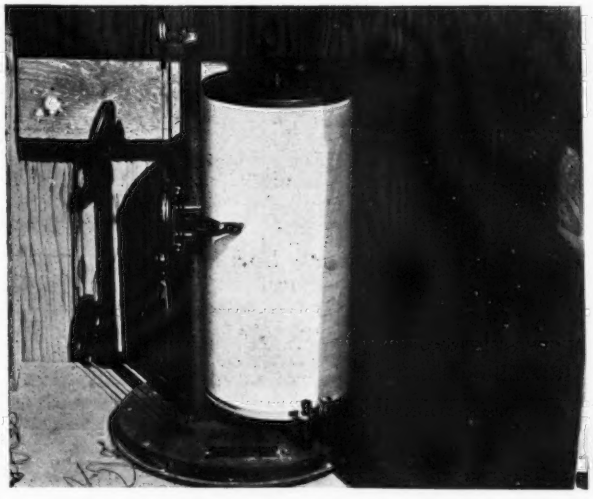


Fig. 2. Recording apparatus installed over dosing chamber

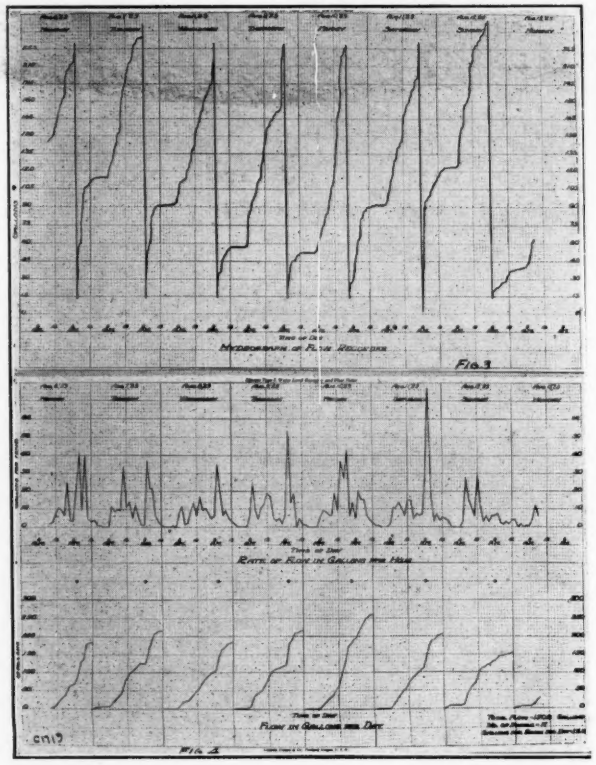


Fig. 3. (Top) A typical record of water level for one week. Fig 4. (Bottom) The rate of flow curve

the recording apparatus as it is installed over the dosing chamber. The record sheets which will record eight days' flow are changed once every week. Fig. 3 indicates a typical record of water level for one week. The straight vertical lines are formed by the automatic discharge of the siphon. From this record sheet the rate of flow is computed and this is shown graphically in Fig. 4. The upper curve indicates the rate of flow per hour for each hour during the day for a seven-day period. This is an exceedingly interesting curve showing the wide fluctuation in the rate of flow. The smaller curves below indicate the accummulated amount of flow for each hour of the various days. The small circles indicate the time of flushing through the siphon. These records, although subject to some inaccuracies, are correct in essential details and represent sufficiently reliable data for a problem of this nature.

The installation was first put in operation in February, 1923, but as might be expected some adjustments were required before reliable data sheets were secured. Beginning with the latter part of May records were secured and the data submitted were summarized from sixteen weeks of continuous operation. During this period the house population varied from seven to eleven persons. The least total weekly flow occurred about the middle of September when eight persons occupied the house and the total flow was 770 gallons. The largest weekly flow occurred about the last of June when 10 persons were occupying the house and the total flow was 1,529 gallons, or nearly twice the least flow during the sixteen-week period. The average flow per person per day during the period was 18.9 gallons, the least flow per person per day was 8.9 gallons, and the maximum was 27.9 gallons. The average flow during the different days of the week is as follows:

Monday	18.5	gallons	per	person	per	day
Tuesday	19.9	"	"	"	"	"
Wednesday	19.0	"	"	"	"	"
Thursday	18.0	"	"	"	"	"
Friday	16.4	"	"	"	"	"
Saturday	22.0	"	"	"	"	"
Sunday	17.2	"	"	"	"	"

The greatest rate of flow during the day usually occurred between 6 and 8 o'clock with the most usual maximum flowing on Saturday during these hours. The curve shown in Fig. 4 is characteristic of all of the curves, the high points coming about the same time, with the low points coming usually after midnight. In some of the curves a small flow is shown during the night which probably was caused by leaky fixtures, although some seepage of water through the sewer line may have caused a small flow at other times. It is noticable that during many hours of the day the rate of flow is very low. This information may or may not be helpful in the design of tanks of the single-chamber type. It is apparent that there are very few hours when we have no flow, and a low rate of flow is not conducive to a wide distribution in an absorption system. It is evident from our records so far, that the tank is needlessly large and the flow is much less than was estimated when the structure was first designed. In view of the facilities of this particular farm house for the use of water, it would seem that the assumptions which are sometimes made for the design of tanks ranging from 30 to 75 gallons per person per day are too high.

A great many additional investigations are required before this matter can be definitely decided. It is proposed, in connection with this experimental work, to make investigations on the flow throughout the community, which will be representative of various farm home conditions. Naturally information of this character in itself is not sufficient to form the basis for the design of structures. Chemical and bacteriological tests will be made later in connection with this project, and these will be worked out to determine if possible the most satisfactory means for farm sewage disposal in Kansas. Because of the very great range of load in septic tanks, as indicated by these data, the Imhoff type of tank uggests itself for investigation. In other words, the liquid matter from the fresh sewage might profitably be put into the absorption field as soon as possible. It is hoped this brief bit of information will stimulate an interest in work of a similar nature at other stations throughout the country. If his work could be carried on simultaneously in a large number of places throughout the United States, it would not be long before information of a fairly reliable nature could be secured.

JUST as our home and municipal conveniences, our methods of transportation and manufacture have experienced a revolutionary change during the past quarter of a century, in that same degree agriculture is destined to change from a desultory life of drugery to an industry of gigantic proportions through an intelligent application of iron and steel, and by means of institutions which will coordinate human activities in this, our Nation's, most important business. That I may share with my professional friends in these opportunities I have pledged myself to become a spoke in the wheel, which is the emblem of the American Society of Agricultural Engineers, and to carry my share of the load in bringing agricultural engineering into its own.

DAVID WEEKS

Survey of Agricultural Engineering Progress

A Review of Current Literature on Engineering as Applied to Agriculture

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Tests of New Implements, G Fischer. [Mitteilungen Deutschen Landwirtschafts Gesellschaft, Berlin, 38 (1923), No. 7, pp. 92-97, figs. 18.] The results of service tests of a large number of new developments in agricultural machinery in Germany are briefly reported. These included, among other things, liquid manure pumps, garden hand plows, bone grinders, grain grinders, artificial rain apparatus, shearing machines, and cultivators.

An Important Improvement of the Plow, E. Meyer, [Mitteilungen Deutschen Landwirtschafts Gesellschaft, Berlin, 38 (1923), No. 7, pp. 97, 98, fig. 1.] The author briefly describes the development of a single share wheel moldboard plow, in which apparently all horizontal side thrust is carried by the rolling friction of an inclined wheel instead of by the land side of the ordinary moldboard plow. Test results indicate a reduction in draft due to this modification of frame bracing is also said to be possible, resulting in a reduction in weight.

The Durability of Fence Posts, J. C. Wooley. [Missouri Station Circular 108 (1922), pp. 4. figs. 2.] This circular contains the details of the studies on methods of prolonging the service of wood posts previously reported by the station, together with the progress results to date.

It is noted that neither setting in gravel nor charring the posts has been of any value. The method of hot treatment with creosote is briefly described and cost data are included. It costs about four cents a post for the two-hour treatment and eight cents for the five-hour treatment, including creosote, fuel, and labor. An estimate of the cost of the different classes of posts in the fence over a period of twenty-five years indicates that three of the fourth-class posts can be purchased for the price of one of the first-class variety, but the treatment and replacement in the fence line durring a period of twenty-five years brings the total cost to practically fifty cents per post where one of the first-class posts is used.

A Report on Comparative Tests of the Flesh and Grain Sides of Oak Leather Belting, R. F. Jones. (Philadelphia: Leather Belting Exchange, 1922, pp. 9, pls. 16.) The object of this series of tests is to determine which side of an oak leather belt gives the highest transmission capacity tested under factory conditions of service.

Under average shop tensions the capacity of the flesh side averaged from 58 to 68 per cent of the capacity possessed by the grain side. It is concluded, in general, that the grain side will transmit from one to three times as much power as the flesh side, depending upon the belt, the tension, and the conditions of service. The flesh side of some belts had a greater capacity than the grain side when first put on the pulleys, but in no case was a higher capacity obtained for the flesh side after the belts were thoroughly run-in. This is said to be due to the fact that the flesh side usually has nearly its maximum capacity at the start without running-in, while the grain side requires a period of running-in to reach this point. Where there was an increase in the capacity of hte flesh side due to running-in, it was usually less that the corresponding increase due to running-in the grain side, and the capacity of the flesh side may decrease slightly with continued running-in.

The time of running-in on the grain side required to bring the better belts tested up to rated capacity varied from five hours with the better belts to forty hours with the poorer belts, and from twenty to sixty-three hours were required to bring them approximately to maximum capacity.

Mean Effective Pressures of Internal-Combustion Engines, R. Matthews. [Power, New York, 57 (1923), No. 11, pp. 403, 404, fig. 1.] Graphic data from tests showing the relation of air temperature, air to oil ratio, air suction pressure, and mean effective pressure in internal-combustion engines are presented and discussed.

The Setting of Portland Cement, compiled by W. L. Gadd. [British Partland Cement Research Association Pamphlet, London, 1 (1922), pp. 35.] Studies on the setting of Portland cement are reported, the object of which was to throw further light on the subject, particularly on the cause of the change in the setting time of commercial cements which occasionally takes place during transit or storage.

It was found that the setting time of cement does not change of itself, even after prolonged storage out of contact with air. It is concluded, therefore, that there is no apparent spontaneous alteration in the chemical composition or physical structure. The time of setting of cement appeared to depend upon the proportion of combined water present in hydrated calcium aluminate or silicate, which tended to form a protective coating around the particles of cement and delayed penetration of water to the active core. The greater quantity of water absorbed by the cement the more impervious was the protective film and the slower was the time of setting. On the other hand, setting was accelarated by any influence which withdrew water from the cement or which attacked, destroyed, or modified the film of hydrated material, thereby enabling the gauging water to penetrate more quickly to the active core of the particle.

Changes of time of setting were brought about only by outside influences such as carbon dioxid and water vapor or active salts, which withdrew water from or acted upon the protective film of hydrous material coating the cement grains. Cement was capable of withdrawing water from salts containing water of crystalization with which it lay in contact for some weeks. Such water hydrated the cement particles and retarded the time of setting. Cement, in contact with salts conaining water of crystallization which have part of such water expelled by pressure, combined with the expelled water and became slower setting.

The setting time of cement resulting from the partial hydration of the particles remained unchanged provided the material was not subjected to outside influences which affected the hydrous film coating the grains. It is stated that the reason for the acceleration or retardation of the time of setting by soluble salts is not sufficiently clear to warrant a definite conclusion being drawn as to whether the action is catalytic or not.

The conclusion is drawn that the use of gypsum as a retarder is sometimes uncertain and irregular in its effects. On the other hand, the regulation of the time of setting by hydration through the medium of steam or water appears to be more permanent.

A bibliography is appended.

The Balancing of Threshing Drums and other High-Speed Rotating Machinery (a new method), M. W. Polak. (Mededeelingen-Landbouwhoogeschool (Wageningne), 25 (1923), No. 2, pp. 26, pl. 1, figs. 6.] A method of detecting nonuniformities in the distribution of weights in circular machine parts rotating at high velocities, such as threshing drums, is described. The method consists in the use of one bearing as a center of rotation and another nonelastic bearing moving freely between two rigid checks at a regulable distance apart. In the case of an uneven distribution of weight in the durm a clearly perceptible rattle takes place. The quantity of overweight at any point due to uneven distribution is determined by measuring the centrifugal force produced by such weight.

It is stated that if the movable bearing is drawn onto one of the checks the rattle will not occur in case the tractive power is equal to or greater than the centrifugal force produced by the overweight. In this event a spring is released until the rattle occurs, and the quantity of the overweight is then directly from an attached scale. It was found that with a threshing drum an overweight of less than five grams could be detected on a radius of thirteen centimeters (5 inches) when operated at 1270 revolutions per minute, and an overweight of ten grams was easily determined.

The author also draws attention to the peculiar influence of air resistance on balancing. It is stated that a one-sided air resistance behaves generally as an overweight. Other related theoretical considerations are discussed.

Return of Seepage Water to the Lower South Platte Riven in Colorado, R. L. Parshall. [Colorado Station Bulletin 279 (1922), pp. 3-72, pl. 1, figs. 23.] The results of a study of the return of seepage water after diversion to the South Platte River between Kersey and Julesburg, conducted under a cooperative agreement between the U. S. Departmnt of Agriculture, Bureau of Public Roads, the Colorado experiment station, the Colorado state engineer, and the counties of Water Districts Nos. 1 and 64 of Colorado, are reported. The purpose of the study was to determine the extent and distribution of such return waters, the periods of maximum and minimum return flow, and various other phases relative to the problem.

The term "waste water" is used to indicate surplus or excess water diverted from the stream and later intentionally returned. The term "run off water" is used to indicate surface water supplies resulting directly from precipitation.

The results are based on the assumption that the inflow streams tributary to the river of practically measurable volumes are either waste waters or natural run-off, while that portion of the supply entering the river channel from water-bearing strata is water originally diverted at higher points.

No attempt was made to distinguish between seepage and return waters. It was found that the return flow to the South Platte River varies from 2 to 8.5 second-feet per mile for various sections of the river from Kearney to Julesburg, and the average return flow between these two points (a distance of 143 miles) is 5.25 second-feet per mile, or a total of about 750 second-

feet. The rate of the under flow from the Riverside Reservoir to the river is approximately 100 feet per day. The reservoirs in the valley are said to contribute about 20 per cent to the return flow. A greater return flow occurs in September than in March and there is said to be a yearly increase in the seepage return. The return seepage increases as the river falls and decreases as the river rises.

The seepage losses from the Empire and Jackson Lake Inlet canals are approximately one second-foot per mile, or 0.4 and 0.58 per cent per mile, respectively. Due to the evaporation there is said to be a marked daily variation of the flow of the river, especially in District 64. The average efficiency of the large storage reservoirs of the lower South Platte Valley is about 50 per cent. The ratio of return seepage to irrigated area is approximately one second-foot to 275 acres. The ratio of the seepage return in Districts 1 and 64 is about the same as the ratio of the gross duty of water in these two districts. The distribution of water through calibrated rating flumes has been found, in some cases, to be more than 50 per cent in error where the amount is based upon the calibration made during the first part of the season.

Lateral Earth Pressure: The accurate experimental determination of the lateral earth pressure, together with a resume of previous experiments, J. Feld. [American Society of Civil Engineers Proceedings 49 (1923), No. 4, pp. 603-660, figs. 6.] Experiments conducted at the University of Cincinnati are reported, which are said to embody the first complete set of tests using a large sized apparatus for measuring directly by means of platform scales the components of the active pressure on a model wall 6 feet high and 5 feet wide.

Tests with sand under various conditions, using vertical and battered walls backed with wood, glass and sheet iron, indicated the reliability of the Poncelet theory of the maximum wedge causing oblique pressure. Tests with walls battered in both directions showed that the direction of the resultant pressure is always inclined to the normal at an angle equal to the angle of friction on the back of the wall. The resultant is said to act above the third point and for a heavy surcharge as high as the 0.4 point. The amount of the horizontal component is said to be given closest by the wedge theory, taking as the angle the experimentally determined angle of internal resistance of the fill. Settling and variations in temperature were found to cause remarkable changes in the lateral pressure.

Methods of analyzing the earth-pressure problem with restrictions on each method are presented, which are said to be the result of a study of more than 650 references covering practically everything written on the subject of earth pressure.

Use of Calcium Chlorid as a Protection Against Freezing of Concrete, P. Cottringer and H. S. Kendall. [Concrete (Detroit), 22 (1923), No. 4, pp. 150-155, figs. 7.] Studies are reported which showed that calcium chlorid when used in proper amounts is very beneficial to concrete that will be exposed to cold weather conditions. A gradual increase in strength was observed with increases in the amounts of calcium chlorid used at various temperatures up to a maximum of 6 per cent. This is taken to indicate the fallacy of a rule which will give definite temperatures at which concrete may be protected from freezing. It was found that 2 per cent calcium chlorid was better than none at any temperature below 32 degrees Fahrenheit, 4 per cent was better than 2 per cent, and the benefit increased up to a maximum of 6 per cent. A mixture containing 2 per cent calcium chlorid was indicated for normal conditions of curing, while 6 per cent was indicated for cold weather.

Calcium chlorid did not keep the concrete from freezing at any temperature lower than the freezing point of the solution used. It had a beneficial effect even at freezing temperatures, the strength with a 6 per cent mixture being in some cases ten times that obtained when no calcium chlorid was used. Amounts of calcium chlorid in excess of 6 per cent, while beneficial at very low temperatures at earlier ages of the concrete, did not give as good results as a 6 per cent mixture at later ages.

This material was found to protect concrete at lower temperatures under alternate low and high temperature conditions than under conditions of low continuous temperature. No additional corrosion of reinforcing steel was found when calcium chlorid was used.

Engine Experiments with Oxidized Oils, J. H. James and F. C. Ziesenheim. [Chemical and Metallurgical Engineering, New York, 28 (1923), No. 12, pp 543-545.] Experiments conducted at the Carnegie Institute of Technology with a farm internal-combustion engine using a fuel made by the catalytic oxidation of kerosene and a fuel of similar character made by the oxidation of gas oil are reported.

The results showed that the oxidized kerosenes, which have a lower boiling range than the raw materials, develop approximately the same power as ordinary kerosene in spite of the fact that their thermal value is one-eighth less. It is believed that there is a more thorough clean-up in the combustion of these partly oxidized fuels, which accounts for their efficiency. The oxidized kerosenes showed lower detonation tendencies than the straight hydrocarbon fuel. Similar experiments with lower boiling oxidized fuels in an automobile engine gave confirmatory results.

The Transmission of Heat by Radiation and Convection, E. Griffiths and A. H. Davis. [Great Britain Department of Scientific and Industrial Research, Food Investigation Board Special Report 9 (1922), pp. IV-44, figs 21.] This is a highly technical report of experiments conducted to obtain data which would be of assistance in investigations on problems of insulation connected with cold-storage construction. The first part deals with the transmission of heat by radiation, with particular reference to the effects of temperature, partitions, and the use of different colored paints on radiating surfaces. The actual temperature of surfaces was found to have marked influence on the quantity of heat transmitted for a given temperature difference. The effect of a partition was to reduce to one-half the heat transferred by radiation from a hot surface to a cold surface. Two partitions diminished the radiation to about one-third. Various colored paints were found to be indistinguishable as regards heat radiation.

The convection studies were limited to natural convection within a closed room. It was found that heat loss by convection increases more quickly than the first power of the temperature excess, and that a power of five-fourths seems generally very satisfactory. Heat loss by convection was naturally least in the horizontal position facing downward, but the rate of loss in a vertical position of a surface was practically a mean of the rates of the two faces of the horizontal surface facing upward and downward. A floor was found to reduce the cooling of a vertical surface by about 4 per cent. On the other hand, the introduction of horizontal baffles above the floor increased the cooling by insuring that the proper portions of the surface are swept by cold air rather than by air which has been previously warmed by contact with the lower portions of the surface.

In studies of the distribution of temperature and velocity in the convection stream, it was found that the disturbance in the atmosphere due to the convection currents set up is confined within a distance of two centimeters from the surface of the hot plate.

Studies of the insulating properties of an air space showed that within the limits of experimental error the heat transfer by convection from unit area of surface across a closed vertical space is independent of the height and width of the space. From 2 inches down to 0.5 inches the width of air space had no influence on the magnitude of the transfer by convection.

An inquiry into the effect of size and geometrical form on loss of heat by convection showed that for pipes less than 8 inches in diameter the heat loss per unit area decreased as the diameter increased, and for pipes of from 8 to 12 inches in diameter the heat loss per unit area was, roughly, independent of the size and curvature, and appeared to be the same for cylinders and plates.

Experiments to determine the influence of height of wall on convection loss from a unit of area showed that the relation between convective heat loss and temperature excess depends on the height of the wall and conversely that the effect of height depends on the temperature excess. This is considered to point to the conclusion that the equation of heat loss can not be expressed in such form that the height and the temperature excess are separate factors, but that these variables must be grouped together suitably. The equation connecting convection loss with both the temperature and the dimensions of a hot body is deduced by the principle of similitude and data for vertical planes and horizontal cylinders are summarized.

A Study of Plasticity of Paint, E. C. Bingham, H. D. Bruce, and M. O. Wolbach, Jr. [Journal Franklin Institute, Philadelphia, 195 (1923(, No. 3, pp. 303-317, figs. 2.] Studies with suspensions made up from white lithopone and pure acid refined linseed oil are reported.

The results indicated that suspensions as well as the emulsoid type of colloids show the properties of plastic materials even at very low concentrations of the disperse phase. The viscosity, as ordinarily measured, was not a constant but a function of the shearing stress. At high concentrations the relation of yield value to concentration was found to be linear and the material truly plastic, while at lower concentrations the relation was not linear, and the material was considered to be pseudo-plastic.

It seemed possible to distinguish sharply between the plastic and pseudo-plastic condition. With lithopone suspended in linseed oil, the transition occurred in a mixture containing 14 per cent of lithopone by volume. It is thought that this concentration may be related to important properties of the material, such as the fineness of structure, adhesion between the particles, etc.

The mobility-concentration curve was linear. This is taken to indicate the possibility, by measuring the plasticity of a paint and of one other paint obtained from the first by thinning, of predicting the plasticity of any paint made by thinning, provided the plasticity correction for the pseudo-plastic paints is neglected.

At 45.6 per cent by volume of lithopone, the mobility would have a zero value. This concentration of zero mobility seemed to be simply connected with the pore space of the material, and is thought to have considerable significance in determining the flow of dispersions.

The Utilization of Molasses in the Manufacture of Motor Fuel, H. Arnstein. [Louisiana Planter, New Orleans, 68 (1922), No. 22, pp. 350-352: 23. pp. 369, 370, fig. 1.] Considerable information is summarized on the manufacture of alcohol motor fuel from waste molasses, apparently employing the usual process of treating the alcohol with ether obtained by dehydration of alcohol with sulphuric acid. Information is also summarized on the use of this fuel in internal-combustion engines.

Friction Testing of Lubricating Oils, W. H. Herschel. [Chemical and Metallurgical Engineering, New York, 28 (1923), No. 13, pp. 594-598, figs. 7.] The results of investigations at the U. S. Bureau of Standards on the measurement of oiliness of lubricants with a friction testing machine are reported. The conclusion is drawn that there is little probability that a journal friction testing machine will ever prove convenient for testing oiliness because the clearance changes with wear. No experimental evidence was obtained that the value of Sommerfield's criterion at the point of minimum friction varies with the oiliness.

Method of Handling Hay in Colorado, G. A. Cumings. [Colorado Station Bulletin, 281 (1923) pp. 3-39, figs. 44.] This bulletin gives a general description of the common and successful methods of curing, stacking, and protecting hay in Colorado.

Alfalfa is the principal hay crop in the state. Curing hay in the swath and windrow is said to be a fast method, producing a good quality of hay and requiring little labor. Curing in the cock is slow and expensive but produces a superior quality of hay. Curing in the swath is not practiced except with timothy hay or grasses in cool, dry weather.

A comparison of the methods of stacking hay indicates that the overshot stacker is used extensively, light, fast, builds stacks with firm, full centers, but requires much labor on the stack. The swinging stacker is similar to the overshot stacker except that labor is reduced on the stack and stacker and there is more liability of building stacks less resistant to weather. The combination stacker is the best adapted to small crews. It greatly reduces labor on the stack and stacker, approaches any side of the stack, but has a low limit of elevation, is heavy for an average team and more likely to build stacks less resistant to water. The derrick stacker is cheap, heavy, slow, builds large stacks, and insures good quality hay. The slide stacker is cheap and has a high capacity, but has a limited applicability. Cable stackers, hay sheds, rope stackers, baling from the windrow or cock, hauling directly to alfalfa mills, and blower and hand methods are said to be used only under special conditions. Mechanical power has been introduced successfully into baling, hoisting, and mowing under conditions favorable for each.

Hay losse sare comparatively small in the state as a whole, and permanent stack covers are not considered practical except in extreme cases.

Rules for measuring hay are said to give only approximate results and vary greatly on different shaped stacks.

Inundation Methods for Measurments of Sand in Making Concrete, G. A. Smith and W. A. Slater. [Engineering and Contracting, Buildings, Chicago, 59 (1923), No. 3, pp. 713-722, figs. 6.] Investigations conducted at the U. S. Bureau of Standards on the development of the principles of a proposed method of accurate field measurements of sand and water for concrete are reported.

The results indicated that when sand is measured in water the quantity of sand per unit of volume is almost constant regardless of the original water content of the sand, and that the water filling the voids in the sand is also nearly constant for any given method of placing. Shoveling of the sand into the water gave more nearly the constant quantities of sand and water per unit of volume than any other method used.

The screening method gave slightly larger quantities of sand and slightly smaller quantities of water per unit of volume than did the shoveling method, and indicated a lower percentage of air voids than either the shoveling or the rodding methods. Rodding of the sand in water gave a larger quantity of sand per unit of volume than any other method used.

Placing the dry and the wet sands according to the standard methods of the American Society for Testing Materials gave quantities of sand per unit of volume slightly less than when the sand was rodded after shoveling it into the water. The quantity of sand obtained when moist sand was rodded in air was much less than when it was rodded in water. It is thought that the inundation method of measurement, when used with a predetermined apparent specific gravity, may afford a convenient means of determining the proportion of sand to other concrete materials even for jobs on which the materials are being measured by other methods.

The variation in surface water per cubic foor of coarse aggregate was approximately proportional to the variation in the fineness modulus of the coarse aggregate. The quantity of surface water was considerably greater for crushed trap rock than for quartz pebbles, and averaged about 9 per cent of the total water used in the concretes tested or about 8 per cent by volume of the cement. The quantity of absorbed water per cubic foot was greater for quartz pebbles than for crushed trap and was independent of the fineness modulus.

The strengths of concretes made with quartz sand measured in water were nearly the same regardless of the condition of the sand, the method of placing it, and the proportion of fine to coarse aggregat.e The use of a constant water-cement ratio for the concrete together with a constant fineness modulus for the mixed aggregate resulted in a nearly constant strength, regardless of the proportion of fine to coarse aggregate in the mix.

The use of a constant fineness modulus did not result in a constant slump or flow of the concrete. The variation in each was approximately proportional to the variation in the fineness modulus of the fine aggregate in the mix. The weight of the concrete per cubic foot and the volume yield of concrete per barrel of cement were practically constant.

The Whirling of an Overhung Eccentrically Loaded Shaft, S. Lees [London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, London, 6, ser., 45 (1923), No. 268, pp. 689-708, figs. 3.] In this paper an effort has been made to indicate the kinematics of the motion of the free end of an overhung eccentrically loaded shaft assuming negligible torsional effects. The general equations of motion are then deduced for an eccentrically loaded disk or flywheel, leading to the conclusion that whirling may be regarded as due to the amplitude of the steady forced oscillation of the free end of the axis around the constrained axis becoming theoretically infinite at a certain speed. Alternatively, whirling even for a symmetrically mounted flywheel is regarded as having a similar origin on account of slight deviations of the center line of the shaft from the straight line initially.

An effort is made to show that elastic viscosity in the shaft itself itself can not prevent whirling in the slightest degree, but that external friction may enable the system to pass safely through what would be a whirling speed without such friction.

The effect of elastic yielding at the bearing was also investigated both for symmetrical and unsymmetrical elasticity. The curious result was obtained that for unsymmetrical elasticity or elliptic motion there are three whirling speeds, neglecting friction. Apart from whirling, there is no question of instability. The two extra whirling speeds are traced down to an effect which vanishes when the motion becomes circular. It is considered possible that external friction may mask these additional speeds of whirling.

The Effects of Waterproofing Materials and Outdoor Exposure Upon the Tensile strength of Cotton Yarn, H. P. Holman, and T. D. Jarrell. [Industrial and Engineering Chemistry, Washington, 15 (1923), No. 3, pp. 236-240, fig. 1.] Experiments conducted by the U. S. Department of Agriculture, Bureau of Chemistry, are reported in which unbleached and unsized warp yarn was treated with various waterproofing materials and exposed to the weather to show the effects on tensile strength. These experiments were apparently made in connection with investigations on the value of various materials for waterproofing and mildewproofing fabrics for farm and other uses.

The treated yarns in most cases showed less deterioration in tensile strength than did the untreated yarns. The bituminous materials as a class, with the exception of pine tar, were among the best waterproofing materials with respect to the effect on tensile strength. Yarns subjected to three laboratory treatments containing asphalt in combination with other products not only showed a higher tensile strength than the untreated yarn after exposure, but were practically as strong after one year's exposure as directly after treating.

Raw drying oils had a greater deteriorating effect than the same oils boiled with metallic driers or partially oxidized by other means. Semidrying and nondrying oils, with the exception of mineral oil, caused as much or more deterioration than the raw drying oils. When burnt umber was added to a drying oil treatment, the treated yarn was much stronger after exposure than yarn subjected to the same treatment without burnt umber and similarly exposed. Rosin and rosin oils caused a decided reduction in tensile strength as exposure. Treatment with rubber solution followed by cold vulcanization with fumes of sulphur monochlorid caused immediate and marked deterioration in tensile strength. Oleic acid caused greater deterioration than other fatty acids used, including palmitic and stearic acids and the fatty acids from linseed oil. Lead oleate had a greater deteriorating effect upon tensile strength than copper oleate.

The rate of deterioration of treated yarns exposed to the weather was greatest during the hottest season of the year, indicating that significant information on the deteriorating or protective effects of treatments on cotton textiles could probably be obtained by exposure for six months in hot weather. The results obtained with yarn are said to be not strictly applicable to woven fabrics.

Laws Governing Gaseous Detonation, T. Midgley, Jr., and R. Janeway. [Journal of Society of Automotive Engineers, New York, 12 (1923), No. 4, pp. 367-373, figs. 12.] An explanation of gaseous detonation, based upon what are considered to be incontrovertible laws, is presented in this paper, and it is shown by the functioning of these well understood natural laws that gaseous detonation is a phenomenon that does not require any hypothetical assumptions to account for its existence. The physical conditions that must exist within an inclosed container when it is filled with an explosive mixture of gases and these gases are ignited are stated and analyzed mathematically, and an application of this analysis is made to the internal-combustion engine for constant throttle and varying temperature of entering charge and for constant etmperature and varying throttle opening and compression ratio.

Motor Transport Performances with Varied Fuel Volatility, C. T. Coleman. [Journal Society of Automotive Engineers, New York, 12 (1923), No. 4, pp. 343-350, figs. 9.] Data obtained by the U. S. Bureau of Standards are presented on the economic operation of a fleet of motor vehicles with fuels of varied volatility under service conditions.

It is stated that while the results may not hold true for cold weather operation, they show that the number of car miles per barrel of crude oil increases as the volatility of the fuel decreases over the range of fuels used. This is said to be true because the percentage of production per barrel of crude oil is not affected materially by the variation in the volatility as represented by the fuels used.

Integral Waterproofings for Concrete, A. H. White. [Industrial and Engineering Chemistry, Washington, 15 (1923), No. 2, pp.150-153, figs. 8.] Studies conducted at the University of Michigan on the properties of concrete and of integral waterproofings used where the concrete is frequently dry are reported. Observations were made on blocks 4 by 4 by 6 inches, made from a single lot of sand and with cement from well recognized commercial brands. The blocks were all made from a 1:3 mix with about 10 per cent of water. The waterprofing materials used included hydrated lime, clay, petroleum residues, and insoluble soaps.

It is noted that the three blocks waterproofed with the insoluble soaps and with the petroleum showed roughly only half the absorption of the plain mortar, which in turn made a distinctly better showing than the blocks containing hydrated lime or clay.

Further studies on the influence of integral waterproofing on the strength of concrete did not warrant the consideration of hydrated lime or clay as waterproofing agents. Studies with seven waterproofing compounds containing insoluble soaps and variable amounts of fatty acid indicated that in some cases, after certain periods of time, mortars containing small amounts of insoluble soaps showed higher strengths than the plain mortar.

AGRICULTURAL ENGINEERING

The Journal of the
American Society of Agricultural Engineers

The American Society of Agricultural Engineers is a voluntary, technical organization of engineers and others concerned with problems in engineering as applied to agriculture. The Society serves a distinct, specialized field in both engineering and agriculture; it is the central clearing house for agricultural-engineering information, the recognized coordinating center for promoting agricultural-engineering development, and the chief point of contact for agricultural engineers in their professional activities.

AGRICULTURAL ENGINEERING is the Society's journal for keeping members informed of the activities and accomplishments of the organization, its committees, and individual members—the medium of expression of progress in agricultural-engineering science; it is also the vehicle for broadcasting generally agricultural-engineering information. Contributions of interest and value to the agricultural field are solicited from both members and non-members of the Society for publication in this journal. Its columns are open for the discussion of all phases of agricultural engineering; the editor welcomes communications on timely subjects of interest or on which the attention of the agricultural-engineering profession should be focused.

RAYMOND OLNEY, M. E. A. E.
Editor

The Function of A. S. A. E.

JUST what is the function of the American Society of Agricultural Engineers? What is the reason for its existence? What service does it render its members, the field of agricultural engineering, and humanity as a whole?

These are questions that no doubt every A. S. A. E. member has asked himself at one time or another. Moreover, it is a natural inquiry of the man who considers applying for membership in our Society. The Constitution states that the object of the Society is "to promote the art and science of engineering as applied to agriculture."

The answer to these questions will be found in the editorial entitled "Agricultural Engineering and the American Society of Agricultural Engineers," appearing elsewhere in this issue. We are greatly indebted to Mr. Trullinger for his very complete and comprehensive analysis of the Society's function, how it is promoting and actually bringing about development in the field of agricultural engineerig, and how it is helping members to advance and render a larger and better service as agricultural engineers.

That the A. S. A. E., as the central clearing house for agricultural engineering information and as the principal point of contact for agricultural engineers, has been the leading factor in the general development of this field will be readily attested to by leading members of this Society.

The Secretary has asked different members of the Society to prepare a statement as to why an organization like the American Society of Agricultural Engineers is essential, how it has helped them to advance, and why they are supporting and takin gpart in its activities. These statements will be published in AGRICULTURAL ENGINEERING under the title "How A. S. A. E. Helps Me" and will be found very interesting and helpful not only to members of the Society but by those who desire to affiliate themselves with our organization.

Attending Annual Meetings

BEGINNING in 1913 I have attended every annual A. S. A. E. meeting with the exception of two. To miuss one of these meetings is to miss an opportunity to find out much of what has occurred during the past year in one's chosen profession. No other means of obtaining this desirable information serves so well. The good fellowship always prevalent at the A. S. A. E. meetings cannot be enjoyed by the man who stays at home.

Human beings, however conscientious, seldom work at their best all of the time. After giving due allowance to periods of reaction, there is no question about the actual need in every life for occasional inspiration. This can best be obtained by agricultural engineers at the annual mettings of the A. S. A. E.

At these meetings prominent agricultural engineers from the north, south, east, and west mingle, enjoying good fellowship and discussing mutual problems in and out of meeting.

Just as travel tends to broaden the viewpoint, so does close, personal contact with fellow workers in the same profession do much to make the participating individual a far better agricultural engineer. Members by the score continually express their appreciation of the inspiration derived from meeting others interested in the same, similar, or allied fields of work and service.

Enthusiasm for one's work is vital to success. The enthusiasm that wins results is renewed yearly by the inspiration to greater activity resulting from attendance at the A. S. A. E. meetings, and by active participation in the affairs of the Society. F. A. WIRT

"How A. S. A. E. Has Helped Me"

THIS is an age of specialization, and one of the first moves that the young man, who is about to leave college and who has specialized along a certain line, should make is to ally himself with other men in the field who are building up the particular line of human endeavor in which he has specialized.

Let us apply this to agricultural engineering. The young man who leaves college where he has specialized in agricultural engineering and has received his degree as such, needs to ally himself wit hthe men in that field. Thus by association he brings to the older men his fresh vison, and in turn the older men lend him their stability and purpose. Both benefit by this contact; while the older men who have become more established can, of course, get along without the young man just leaving college better than he can get along without them, yet it would be a tragedy if all the contributing elements could not be brought together for mutual advancement and helpful purpose. In the field of agricultural engineering the American Society of Agricultural Engineers is the only vehicle through which this can be done.

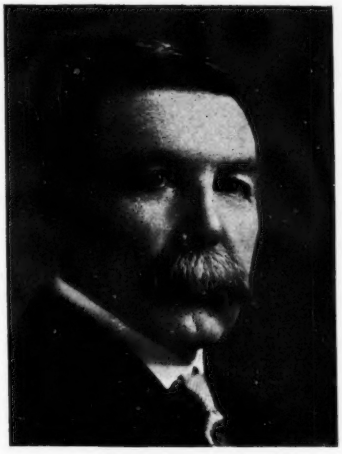
What does the A. S. A. E. mean to me? How has it helped me to advance and render a larger, better service? Is it my duty to support the Society and take part in its activities? My answer is that any man who joins the Society with the idea of selfishly securing benefits for himself will never amount to much to himself or anybody else. In this connection, soon after I became twenty-one years of age I made application to join a certain society and when I received the application blank to fill out, this statement came to my attention: "Uninfluenced by the importunities of friends and uninspired by mercenary motives, I freely and voluntarily offer myself as a candidate, etc." Those words impressed themselves so indelibly upon my mind at that time that I have never forgotten them, and whenever I have sought the privilege of joining any society, it has always been with the thought that with my associations with other fellows of my class and calling, I would in my own individual way contribute toward the upbuilding and perpetuity of that society and lend myself in my humble effort toward the advancement of all men with whom I come in contact.

I have now passed my sixty-first birthday and see more clearly than ever that societies of the character of A. S. A. E., and in fact any fraternal body, are worth to the individual member just so much as he puts into them through his individual effort in contributing to their upbuilding. I would not like to see any young man coming out of college, or any other candidate for membership, join the American Society of Argricultural Engineers with any other idea. It seems to me that the ultimate stability and perpetuity of the A. S. A. E. will rest more securely upon a foundation of pure unselfishness on the part of its membership in their dealings with the Society.

W. B. CLARKSON

Dr. Fortier Elected an Honorary Member

DR. SAMUEL FORTIER, senior irrigation engineer and chief of irrigation investigations in the U. S. Department of Agriculture, has been elected an honorary member of the American Society of Agricultural Engineers in recognition of his invaluable service in promoting the reclamation of arid lands by means of irrigation. This nation, and particularly the states of the West, owe Dr. Fortier a debt that can never be paid for the invaluable work he has done in developing the land and water resources of the West. History will record his service as outstanding to a degree unsurpassed by the achievements of few men.



DR. SAMUEL FORTIER

Samuel Fortier, the son of Leandre and Ann Reid Fortier, was born at Leeds, Province of Quebec, Canada, on April 24, 1855. During his boyhood, he attended the log schoolhouse in winter and worked on his father's farm in summer. He was engaged, when a mere boy, as brakeman and river driver for a lumbering firm in New Hampshire, and the wages received were carefully hoarded and later expended in taking a three years course at the McGill Normal School in Montreal. Then followed two years of teaching as principal of the Danville Academy at Danville, Quebec, and the funds thus obtained were subsequently used to take a course in civil engineering at McGill University, from which he graduated in 1885. In 1896 he received from the same university the degree of Master of Engineering, and in 1907 the degree of Doctor of Science.

The first year after graduation was spent in the building of wooden bridges and in assisting to locate the Denver and Rio Grande Western Railway over the Continental Divide. This work not being to his liking, he secured employment with the Denver Water Company early in 1886, as first assistant engineer, and continued in the employ of this company until February, 1890. He was mainly occupied during this four-year period in the design and construction of the Cherry Creek Water Supply costing $250,000, the South Platte Water Supply costing $1,250,000, the building of the Capitol Hill reservoir, and the laying of a large amount of cast iron and wooden pipe.

In 1890 he severed his connection with the Denver Water Company in order to design and construct for the Bear River Canal and Ogden Water Works Company a system of water works for Ogden, Utah, which was done within a year at a cost of $375,000. In the spring of 1891 he was appointed chief engineer and superintendent of the Bear River Canal and Ogden Water Works, the combined cost of the two plants being over $2,000,000. While so engaged, he maintained and operated the Ogden Water system, extended the main branches of the irrigation system, renewed part of the dam across Bear River and other structures and designed and put into operation a system of water distribution and delivery for the irrigation system. In 1893, he resigned this position to accept the chair of civil and hydraulic engineering and irrigation engineer of the Experiment station at the Agricultural College of Utah. While holding this position, he acted as consulting engineer of the Bear River Canal and Ogden Water Works Company and other corporations, designed and supervised the construction of a system of water works for Logan, Utah, and was also hydrographer of the U. S. Geological Survey for the territory of Northern Utah and Southern Idaho. During this period, he was the consulting engineer of the Davis and Weber Counties Canal Company in the design and construction of the East Canyon dam in Morgan County, Utah, the cost of which was $127,000.

In April, 1898, he tendered his resignation as a member of the college faculty in order to accept his former position with the Bear River Canal Company. He was so occupied until the canal system was sold. In June, 1899, he became irrigation engineer of the Montana agricultural experiment station, and a year later was appointed director as well as irrigation engineer. While so employed, he also acted as hydrographer for Montana of the U. S. Geological Survey and agent of irrigation investigations of the U. S. Department of Agriculture.

In July, 1903, he obtained a year's leave of absence to take charge of state and federal cooperative irrigation investigations in California and resigned the directorship of the Montana exeriment station a year later. He remained in charge of the investigations in California until promoted to chief of irrigation investigations, U. S. Department of Agriculture.

During the fifteen years that have since elapsed, he has devoted his energies to the upbuilding of the western commonwealths by means of irrigation and the reclamation of arid lands. His knowledge of western agricultural conditions has been acquired by study and practice on the ground, and few men have had the same opportunity to gain so close an insight into such phases of irrigation as the construction of works, the operation of systems, the difficulties confronting settlers, the need of efficient administration and the investigation of irrigation problems in general. While striving to develop in the most efficient and economical way the land and water resources of the West, his sympathy has always gone out to those who were suffering privations in their efforts to establish homes in a forbidding desert.

Besides many articles, he is the author of over thirty state and federal publications on irrigation and allied subjects, and his textbook on "Use of Water in Irrigation" is now quite generally used in the institutions of the western states.

A. S. A. E. and Related Activities

A. S. A. E. Officers for 1924

THE ballot for the election of officers for 1924 of the American Society of Agricultural Engineers resulted as follows:

President—S. H. McCrory, chief, division of agricultural engineering, Bureau of Public Roads, U. S. Department of Agriculture.

First vice-president—L. J. Fletcher, professor of agricultural engineering, University of California.

Second vice-president—E. R. Jones, professor of agricultural engineering, University of Wisconsin.

Treasurer—Raymond Olney, secretary of the Society.

Member of the Council—F. W. Ives, professor of agricultural engineering, Ohio State University.

Nominating Committee—J. L. Strahan, chairman, J. B. Kelley and I. W. Dickerson.

These officers will take office immediately following the annual meeting in November, and will serve until the annual meeting in June, 1924, inasmuch as beginning 1924 the annual meetings of the Society will be held thereafter in June of each year.

The Annual Meeting

THE tentative program for the seventeenth annual meeting of the American Society of Agricultural Engineers to be held at the Great Northern Hotel, Chicago, November 8, 9, and 10, 1923, is published elsewhere in this issue. At this writing the program is not entirely complete, but is sufficiently so to give members of the Society fairly complete information on the subjects to be presented at that time. The Meetings Committee has spared no effort in the preparation of this program, which, all in all, is unquestionably the best ever presented by this Society.

The sessions of the convention will be held in the Crystal Room and the Fraternity Room on the mezzanine floor, and general headquarters will be located in the hall on the same floor between the two meeting rooms. Members and guests are urged to register as soon as they arrive.

As the program is arranged, the convention will open with meetings of the farm structures and farm power and machinery sections, which will be held simultaneously beginning at 9:00 A. M. of the first day, Thursday, November 8. The first general session does not come until the afternoon of the same day. The general sessions are held, beginning 1:30 P. M. of each day, in the Crystal Room, and all sections will attend these general sessions. The formal open-

ing of the convention, therefore, will not take place until 1:30 P. M. of the first day, whereas the farm structures and farm power and machinery section will have their first session on the forenoon of that day.

The Society is very fortunate, and is deeply indebted to the Meetings Committee in securing men of national prominence to address the convention at both the general and professional sessions. R. M. Hudson, of the division of simplified practice, U. S. Department of Agriculture, will discuss the economic aspects of standardization at the first general session, which will be followed by complete discussions on intra-company standardization and its relation to general standardization by E. A. Johnston, director of engineering of the International Harvester Company, O. B. Zimmerman, experimental engineer for the same company, and Theo Brown, manager of the experimental department of Deere & Company. W. H. Stackhouse, general manager of French & Hecht, a past president of the National Association of Farm Equipment Manufacturers and a leader in the farm equipment manufacturing field, will address the convention on a live subject pertaining to that field at the second general session on Friday. C. F. Kettering, president of General Motors Research Corporation and one of the leading engineers in the automotive field, will address the general session on Saturday on the subject, "Engineering Research," with particular reference to its application to agricultural engineering.

During the past year such an impetus has been given to the problem or rural electrification that it promises to become one of the most important in the farm power field, and because of the interest attaching to this subject the program this year has been designed to present a vivid cross section of this problem. J. W. Coverdale, secretary of the American Farm Bureau Federation and chairman of the newly created Committee on the Relation of Electricity to Agriculture, and H. M. Aylesworth, managing director of the National Electric Light Association, will be important features on the program of the rural electrification question.

As has been the case at previous meetings, the program of the farm structures section has been saturated with the reports of recent developments in that field. Not only will the results of the important work during the past year be presented, but a perspective will be given of the big problems which confront the agricultural engineer in the immediate future. Of particular importance in this connection is the paper to be presented by Theo F. Laist, agricultural engineer for the National Lumber Manufacturers Association, at the afternoon session of November 8.

Because of the importance of a relatively few subjects, the program has been designed with a view to giving sufficient time for intensive consideration of major problems in the farm power and machinery field. With respect to the tractor particularly, the livest subject in the industry today is the development of a general-purpose machine. This problem will be discussed by F. A. Wirt, of the J. I. Case Threshing Machine Company, both as relates to agricultural development and its engineering aspects. A. S. A. E. members having special interest in this problem are urged to attend the sessions prepared to take part in the discussion following the address by Mr. Wirt.

E. V. Collins, of Iowa State College, has developed a new form of tractive dynamometer during the past year, and will describe this piece of apparatus in detail. In addition he will give some striking results that have been obtained with this machine in testing horses for maximum pulling power.

There has never been a time in the farm-machinery industry when standardization has received more attention than it is receiving today, and the addresses on this subject referred to in a foregoing paragraph will be looked forward to with special interest by the industry. Here will be an opportunity to find out what the farm-machinery industry has been doing along standardization lines and hear the subject discussed by engineers who have given a large amount of study to it.

The reclamation program, no less than other section programs, promises to be of unusual interest. Under the title "A Review of Important Advances in American Irrigation Since 1900" Dr. Samuel Fortier, chief of irrigation investigations in the U. S. Department of Agriculture, and chairman of the Committee on Irrigation, assisted by members of that committee and others, will present a vast amount of exceptionally interesting and invaluable material on the various phases of irrigation. John Swenehart, professor of agricultural engineering, at the University of Wisconsin, and chairman of the committee on land clearing, assisted by other members of that committee, will present a large fund of important data and information on recent developments in land clearing. In addition the reclamation program will include important discussions and reports on drainage and soil erosion, on which members have been working during the past year.

The College Section program which is under the direction of Prof. Daniels Scoates, chairman of the section, will be one of the strongest programs that that section has ever presented for consideration. At previous meetings the college men have regretted the small amount of time that has been available for the discussion of strictly educational problems. This year the evening session of the first day and the entire third day of the convention will be given over to the program of the college section, during which time no other sessions of the convention will be in progress. The college section is particularly fortunate in having secured Dr. Buckingham, of the bureau of educational research with the Ohio State University, who will bring a message on educational methods which will command attention.

Through the medium of various committee reports the whole problem of agricultural engineering developments along the lines of teaching, extension, and research, will receive consideration.

Reservations for the Annual Meeting

IT is urged that A. S. A. E. members who will attend the annual meeting at the Great Northern Hotel, Chicago, in November, reserve accommodations early. Reservation should be made direct with the hotel and not through Society headquarters. The schedule of rates given by the management of the Great Northern Hotel is as follows:

Single rooms, without bath, $2.50 and $3.00.
Double rooms, without bath, $4.00 and $5.00.
Single rooms, with bath, $3.50, $4.00, and $5.00.
Double rooms, with bath, $5.00, $6.00, $7.00 and $8.00.

Committee on Relation of Electricity to Agriculture Organized

A MOVEMENT to stimulate a complete investigation of the application of electricity to agriculture which has been gaining momentum during the past year was brought to a working basis at a meeting held in Chicago, September 11, attended by H. M. Aylesworth, Marshall E. Sampsell and G. C. Neff of the National Electric Light Association, and O. E. Bradfute, J. W. Coverdale and H. W. Moorhouse of the American Farm Bureau Federation.

At this conference final approval was given to the formation of a Committee on the Relation of Electricity to Agriculture which is composed of O. E. Bradfute, J. W. Coverdale and H. W. Moorhouse representing the American Farm Bureau; Marshall E. Sampsell, G. C. Neff, J. C. Martin and Arthur Huntington representing the National Electric Light Association; R. C. Cosgrove representing the manufacturers of farm electric plants; J. B. Davidson representing the American Society of Agricultural Engineers, and S. H. McCrory representing the U. S. Department of Agriculture. E. A. White has been employed as director to devote his full time to the work of the Committee with an office at the American Farm Bureau Federation headquarters, Chicago.

The formation of this committee brings together various groups which are vitally interested in the problem of rural electrification and marks one of the first, if not the first, time in American history when the farmer through his own representatives is actively participating in solving the problems to be met in taking a new form of power onto the farm. Reports show that approximately 400,000 farms have electric service, indicating that it is now available on less than seven per cent of the farms of the nation. This committee will endeavor to direct development work along sound economic and engineering lines, eliminating the cut-and-try method and insuring that maximum results are secured at a minimum cost. It is a new form of cooperative movement and illustrates the possibilities when industries are properly organized. Without organizations such as the American Farm Bureau Federation representing agriculture and the National Electric Light Association representing the central station companies such work as this would not be possible.

This committee recognizes that electrical service on the farm offers great possibilities for improving living conditions, lightening the work of the household, and reducing the cost of production, but before these can be realized there are many economic and engineering problems to be solved. This can best be met by securing the cooperation of men trained in these special fields who have a complete

understanding of the situation. This is the line along which the committee proposes to work. The farm power problem will be analyzed and the best talent available put to work on the application of electrical service to this great industry.

The first step in this direction, at the request of the Committee, has been the undertaking by the U. S. Department of Agriculture of a national farm power survey to determine the amount of power used in agriculture, the power requirements for various farm operations, the types and sizes of prime movers used, the power requirements of various machines and what operations are still done by hand. Out of this survey should come the fundamental agricultural facts which will form the basis of the economic studies and engineering developments necessary for the proper solution of the problem.

A preliminary investigation has shown that in many foreign countries rural electrification is already well started, indicating that the American farmer will meet world competition from farms which are enjoying the benefits of electrical service. In order that all information possible may be available, it is necessary that a foreign survey be conducted and plans are being made for this.

As we rightfully look to the U. S. Department of Agriculture and the various state agricultural experiment stations for research information on fundamental agricultural problems, these institutions will have the problem of electrification laid before them and be urged to undertake a complete investigation of the application of electricity to agriculture. Such a series of investigation will not only involve the application to what are today standard farm practices, but also the probing for new uses made possible through the peculiar properties of electricity and its ease of distribution about the farm.

Surveys will be conducted to determine for what operations electricity is used today and also to find out what obstacles stand in the way of its general application to farm operations. Authorities are agreed that we are just entering an electrical age and agriculture does not propose to be one step behind the procession in this development.

Regarding this work, J. W. Coverdale, secretary of the American Farm Bureau Federation, said: "America is fast passing into an electrical age. Electricity is being adapted to many uses. It has done much to lighten the burden of the housewife in the cities, and will do equally as much for the farm woman and the farm home when rural electric lines become as popular as the rural telephone. Electricity will be adapted to agriculture, and the Committee on the Relation of Electricity to Agriculture has an important line of work to perform in helping to lay the foundation of rural electricity without exploitation."

H. W. Aylesworth, managing director of the National Electric Light Association also said in this connection: "The electric light and power companies of the United States have already reached more than 400,000 rural customers and in my opinion these companies will, within a period of eight years, serve electricity to 500,000 additional farms. It is the duty of the electrical industry to carry every electrical labor device to the farm so that the farm family may have every electrical convenience now enjoyed by the city family. It should be apparent that human labor on the farm is less efficient than electrical machinery which can be operated by the farmer pressing the button. Within a few years' time farm chores will be done by the electrical servant with much more efficiency and will be a boon to every farmer in the land."

Meeting of the Advisory Committee of the A. S. A. E. College Section

A MEETING of the Advisory Committee of the College Section of the American Society of Agricultural Engineers has been called by the chairman, Daniels Scoates, to be held at the Great Northern Hotel, Chicago, on November 7, the day prior to the opening of the seventeenth annual meeting of the Society. Both the retiring and newly elected members of the Advisory Committee will be expected to attend this meeting to discuss problems of the College Section and plans for the ensuing year.

The Committee will tackle the big problems of committee appointments and requirements with a view to increasing the scope and effectiveness of committee activities.

In addition the program for the Committee's meeting includes such subjects as the principal objectives in the college teaching of agricultural engineering, inspection of college agricultural-engineering departments, the lower cost of production project, teaching methods in agricultural engineering, and the agricultural-engineering foundation.

National Horse Pulling Contest

A PULLING contest for horses and mules will be a feature of the National Horse Show to be held in Squadron A Armory, New York City, November 10 to 17. The horse-testing dynamometer recently developed by Profs. E. V. Collins and J. B. Davidson, of the agricultural engineering section of the Iowa agricultural experiment station, is to be used to test the pulling power and pace of draft teams entered in the contest. The trials are sponsored by the agricultural engineering division of the Iowa State College, the Committee on Animal Motors of the American Society of Agricultural Engineers, and the Horse Association of America, all co-operating with the National Horse Show.

Personals

W. A. FOSTER, formerly assistant in the agricultural engineering section of the Iowa agricultural experiment station, is now professor of agricultural engineering and head of the department at the University of Georgia. He succeeds George A. Fain, who was compelled to resign on account of his wife's health and who is now engaged in building work on the west coast of Florida.

STANLEY F. MORSE, head of the Morse Agricultural Service, 132 Front Street, New York City, announces the enlargement of his staff through the association of George M. Pommel, formerly chief, animal husbandry division, U. S. Department of Agriculture, who will deal with livestock production in its various phases, and Edwin W. Mitchell, vice-president, New York State Fruit Growers Association, fruit grower and consulting horticulturist, who will take charge of matters pertaining to the profitable raising of fruits and vegetables. Soil, crop, implement, and management problems will continue to be handled by Mr. Morse, who is a poineer consulting agriculturist with wide experience as consultant to some of the largest commercial companies in the country and who has enjoyed outstanding success along these lines.

New Members of the Society

Frank Binns, teaching mechanical drawing and machine design, University of Pennsylvania, R. F. D. No. 3, Hammonton, New Jersey.

Ross Dowell, extension and promotion work, Portland Cement Association, 1021 Polk Boulevard, Des Moines, Iowa.

Kurt Grunwald, consulting agricultural engineer, Medford, Long Island, New York.

Charles Lee Ostrander, engineer and superintendent, Lichty Metal Products Company, Waterloo, Iowa.

TRANSFER OF GRADE

Louie Pickus, repairs department, International Harvester Company, Sioux City, Iowa. (From Student to Junior Member.)

Applicants for Membership

The following is a list of applicants for membership received since the publication of the September issue of AGRICULTURAL ENGINEERING. Members of the Society are urged to send pertinent information relative to applicants for the consideration of the Council prior to election.

Alexander Gordon, assistant in rural engineering, College of Agriculture, University of the Philippines, Los Banos, Laguma, Philippines.

Claude D. Kinsman, agricultural engineer, Bureau of Public Roads, U. S. Department of Agriculture, Washington, D. C.

Capt. Brynar James Owen, Ministry of Agriculture and Fisheries, 10 Whitehall Place, London, England.

John D. Parsons, assistant professor of agricultural engineering, University of Nebraska, 3311 Y Street, Lincoln, Nebraska.

Andrics Johannes van Tonder, head of department of agricultural engineering, Transvaal University College, Pretoria, South Africa.

D. S. Weaver, associate professor of agricultural engineering, North Carolina State College, Raleigh, North Carolina.

TRANSFER OF GRADE

D. C. Heitshu, department of agricultural engineering, Virginia Polytechnic Institute, Blacksburg, Virginia.

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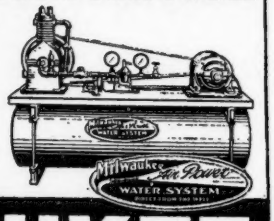

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1922 Transactions Available

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Year	Volume	Prices of Transactions To Members	To Non-Members	Year	Volume	Prices of Transactions To Members	To Non-Members
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1911	V	.50	1.00	1918	XII	.50	1.00
1912	VI	.50	1.00	1919	XIII	.50	1.00
1913	VII	.50	1.00	1920	XIV	,50	1.00
1914	VIII	.50	1.00	1921	XV	.75	1.50
1915	IX	.50	1.00	1922	XVI	1.00	2.00
1916	X	.50	1.00				

American Society of Agricultural Engineers, Mt. Clemens, Michigan, U. S. A.